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ABSTRACT

To examine the relationship between spelling and reading using full graphemic cues, a study administered tests of oral reading, verbal IQ, reading comprehension, knowledge of letter-sound correspondences, and spelling achievement to 47 fifth-grade students. In addition, data was collected relative to gender and time spent reading outside the classroom. Analysis of the relationship among these variables was performed using structural analysis. Several hypothetical structural models were tested for "goodness of fit." Time spent reading out of class was found to have little relationship with any of the other variables, and no significant differences were found relative to these variables with respect to gender. The best fit model suggested that spelling achievement results from knowledge of letter-sound correspondences, which in turn results from verbal IQ and the extent to which reading is carried on using full graphemic cues. Verbal IQ also heavily determined the full graphemic cues tendency and reading comprehension. (One table of data, one figure, and 17 references are attached.) (MM)

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THE RELATIONSHIP BETWEEN READING USING FULL GRAPHEMIC CUES AND SPELLING

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The construct of reading by full graphemic cues was operationalized using an oral reading test. This, along with tests of verbal IQ, reading comprehension, knowledge of letter-sound correspondences, and spelling achievement were administered to 47 fifth graders. In addition, data was collected relative to gender and time spent reading outside of the classroom. Analysis of the relationship among these variables was performed using structural analysis and several hypothetical structural models were tested for "goodness of fit." Time spent reading outside of class was found to have little relationship with any of the other variables, and no significant differences were found relative to these variables with respect to gender. The best fit model suggests that spelling achievement results from knowledge of letter-sound correspondences, which in turn results from verbal IQ and the extent to which reading is carried on using full graphemic cues. Verbal I.Q. also heavily determines the full graphemic cues tendency and reading comprehension. Following is an explanation of the operationalization of reading by full graphemic cues, as well as the correlation matrix and best fit model specifying the relationship among the components of this study.

Reading by Full Graphemic Cues

A strong relationship between reading and spelling has been observed many times (Shanahan, 1984). However, discrepancies in this relationship have also been observed. It is not uncommon, for example, to discover children and adults who read well but do not spell well (Frith, 1980; Baron, et. al., 1980). This phenomenon could possibly be accounted for by the hypothesis that reading can be efficiently carried on without using all of the letters of the words being read. Frith (1980) and others have found evidence that many individuals recognize words without using all the letters of the words they read, and that there is a wide variation in the extent to which reading is carried on using all the letters of words, i.e., reading by full graphemic cues.

Printed words have four attributes, or identities (Ehri, 1980):

1. Semantic, relating to their meanings,
2. Syntactic, relating to their grammatical functions,
3. Phonological, relating to their phonemic properties, and
4. Orthographic, relating to letter sequence and visual form.

According to Ehri's Word Amalgamation Theory, a cognitive synthesis of these attributes results in the formation of abstract word units in memory, and the sum of these units forms the lexical memory, or internal lexicon. P.T. Smith (1980) has found evidence for the use of these attributes at various levels of complexity and interaction according to the nature and difficulty of the reading and writing tasks. Spelling seems to be particularly, although not exclusively, concerned with accurate representations of a word's orthographic identity. Considering that qualitative differences exist in reading and spelling processing styles and that meaningful correlations between reading and spelling measures have been observed, Ehri's theory implies that differences in the extent to which individuals use all letters, i.e., the visual orthographic identities of words, in the lexical decisions associated with reading may be related to the extent to which individuals can produce accurate letter-by-letter spellings.

Frith (1980) has found evidence to support this position in attempting to explain why some proficient readers spell well while others do not. She describes the former as those whose reading processes involve full graphemic cues, and the latter as those whose

reading involves only partial graphemic cues.

Strong empirical support for the existence of a reading style by some readers that only uses some of the letters is provided by letter cancellation tasks, which clearly show that attention by the reader to component letters in a word varies systematically with the position of the letter in the word that is read (Smith and Groat, 1979). (See also Hogaboam (1979), Rummelhart (1977) and F. Smith (1978).) Frith found further a relationship between these variations and variations in spelling achievement.

The effective word study techniques described by Allred (1984) and Laurent and Stetson (1984) that have been shown to significantly affect spelling achievement appear to be graphemically-oriented.

It was the central purpose of this study to investigate the question of association between differences in spelling achievement and differences in the extent to which reading is carried on using full graphemic cues (FGC).

In designing this study, an attempt was made to operationalize the construct of full graphemic cues reading. Frith (1980) postulated that individuals who read using less than full graphemic cues accomplish decoding by heavily utilizing only part of a word's

graphemes together with the surrounding context. It was hypothesized that if a reading situation could be created in which contextual cues and graphemic cues conflicted, then those who read using less than full graphemic cues would be more likely to recognize words on the basis of the context.

For example, suppose the context of an oral reading passage dictated the word "through," but instead the text actually read "though" as in the sentence "It took a long time to walk though the forest." A conflict between graphemic and contextual cues would be created by the use of a graphemically-similar but contextually-inappropriate replacement word that varies from the contextually-appropriate one by a single letter. It would be expected that partial cue readers would tend not to detect the replacement and "read" the word the context dictates--in this case, "through." Thus the use of graphemically-similar but contextually-inappropriate replacement words creates an incongruency that would be detected only if the words were read using all of their graphemic cues.

A pilot investigation was conducted prior to this study to field test an assessment procedure of this sort, hereafter called The Test of Full Graphemic Cues, or FGC. It was administered to 24 fifth grade

students of varying reading ability. Students who read a replacement word graphemically correct also consistently gave indications of their awareness of the graphemic-contextual incongruency associated with the replacement, hence indicating the use of both graphemic and contextual cues. On the other hand, those who read replacements in a graphemically incorrect manner, always "read" the word the context indicated should have been there. Thus, the scores obtained from this test revealed reading patterns that ranged from use of both full graphemic and full contextual cues to reading that used contextual cues and only a partial set of graphemic cues.

Inferring cognitive processes from reading mispronunciations has been carried on for many years. For example, several investigators have used a technique known as "Miscues Analysis" to infer the use of graphemic, phonologic, syntactic, and semantic cues in reading based upon a comparison of incorrect responses with expected responses. (See Goodman, 1968; Weber, 1968; Leu, 1982; Chittenden, 1984; Stewart, 1985.) The Test of Full Graphemic Cues (FGC) increases the opportunity for errors of graphemic omissions and allows inferences based upon the responses associated with those opportunities.

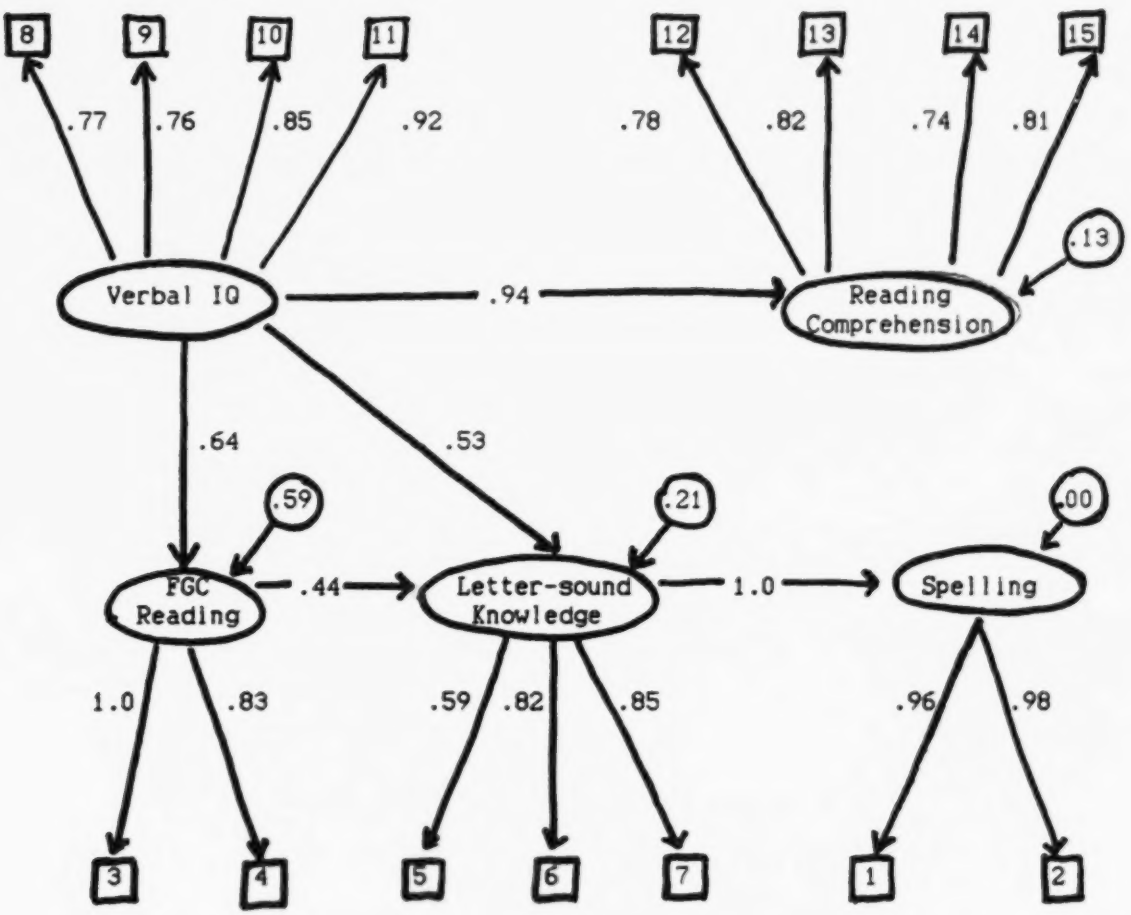
A correlation coefficient of .84 was obtained between scores obtained from the field test of this

assessment procedure and an informal spelling assessment, thus suggesting the value of the more rigorous research study described herein.

Intercorrelations Among Subtests of Components Related to FGC Reading

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Spell test														
2. Spell retest	.94													
3. FGC subst.	.81	.76												
4. FGC omiss.	.72	.61	.84											
5. Phonics one	.51	.61	.31	.23										
6. Phonics two	.74	.83	.67	.43	.45									
7. Phonics three	.80	.83	.66	.55	.60	.72								
8. IQ word meaning	.65	.60	.54	.43	.31	.44	.57							
9. IQ sent complet.	.66	.60	.52	.47	.29	.49	.57	.59						
10. IQ word classif.	.66	.63	.61	.47	.33	.54	.63	.63	.68					
11. IQ word analogy	.79	.76	.56	.55	.50	.56	.74	.71	.68	.79				
12. reading literal	.59	.55	.53	.48	.18	.46	.49	.54	.55	.64	.65			
13. reading infer	.61	.60	.53	.43	.32	.49	.55	.64	.53	.64	.72	.67		
14. reading main id.	.55	.55	.43	.37	.22	.34	.48	.61	.58	.60	.66	.52	.63	
15. reading vocab	.53	.54	.40	.28	.32	.39	.54	.58	.55	.71	.70	.68	.64	.57

Standardized solution for model of spelling and reading components relationship.



Note. Observed indicator variables are enclosed by rectangles; (refer to correlation matrix for the meaning of numerals); unobserved latent components are enclosed by ellipses. Numerical estimates of the structure coefficients (betas) appear between the latent components. Numerical estimates of the factor loadings appear between the latent components and the indicator variables. Unexplained betas are enclosed in circles.

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